

Access DB# 112565**SEARCH REQUEST FORM**

Scientific and Technical Information Center

Requester's Full Name: Kelech, Ekwim Examiner #: 77000 Date: 1/21/04  
Art Unit: 1713 Phone Number: 872 1099 Serial Number: 10/065636  
Mail Box and Bldg/Room Location: LEM 10A25 Results Format Preferred (circle): PAPER DISK E-MAIL

**If more than one search is submitted, please prioritize searches in order of need.**

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: \_\_\_\_\_

Inventors (please provide full names): See B/B Sheet

Earliest Priority Filing Date: \_\_\_\_\_

*\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

Please search for the first compound  
in claim 21.

Particularly where  $m = 0$   
 $E = \text{Oxygen}$   
 $R = H$ .

Please call if you have any questions

\*\*\*\*\*

**STAFF USE ONLY**

Searcher: M. Newell  
Searcher Phone #: 571-272-2538  
Searcher Location: Remsen 4A30  
Date Searcher Picked Up: 1/23/04  
Date Completed: 1/26/04  
Searcher Prep & Review Time: 45  
Clerical Prep Time: \_\_\_\_\_  
Online Time: 90

**Type of Search**

NA Sequence (#) \_\_\_\_\_  
AA Sequence (#) \_\_\_\_\_  
Structure (#) 2  
Bibliographic ☒  
Litigation \_\_\_\_\_  
Fulltext \_\_\_\_\_  
Patent Family \_\_\_\_\_  
Other \_\_\_\_\_

**Vendors and cost where applicable**

STN 1193.03  
Dialog \_\_\_\_\_  
Questel/Orbit \_\_\_\_\_  
Dr.Link \_\_\_\_\_  
Lexis/Nexis \_\_\_\_\_  
Sequence Systems \_\_\_\_\_  
WWW/Internet \_\_\_\_\_  
Other (specify) \_\_\_\_\_

L Number	Hits	Search Text	DB	Time stamp
-	91	\$-5H-furan-2-one	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/01/21 15:20
-	115673	524/\$7.CCLS.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/01/21 15:20
-	0	\$-5H-furan-2-one and 524/\$7.CCLS.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/01/21 15:20



# STIC Search Report

## EIC 1700

STIC Database Tracking Number: 112565

**TO: Kelechi Egwim**  
**Location: REM 10A25**  
**Art Unit : 1713**  
**January 27, 2004**

**Case Serial Number: 10/065636**

**From: Michael Newell**  
**Location: EIC 1700**  
**REMSSEN 4A30**  
**Phone: 571/272-2538**  
**MNewell@uspto.gov**

### Search Notes

Transcript 1 contains results from a substructure search performed using the first compound of claim 21, in which  $m=0$ ,  $E=\text{oxygen}$ , and  $R=\text{H}$ . The structure search was then further limited by a text search.

Transcript 2 contains results from the larger (parent) structure search, which encompassed the six compounds of claim 28, again followed by a text search.



# STIC Search Results Feedback Form

**EIC17000**

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader  
571/272-2505 REMSEN 4B28

## Voluntary Results Feedback Form

- I am an examiner in Workgroup:  Example: 1713  
➤ Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature  
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28



=> d his

(FILE 'HOME' ENTERED AT 12:39:07 ON 26 JAN 2004)

L1 FILE 'LREGISTRY' ENTERED AT 12:39:14 ON 26 JAN 2004  
STRUCTURE

FILE 'REGISTRY' ENTERED AT 12:42:26 ON 26 JAN 2004  
ACT EGW636/A

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L2 ( 66284)SEA FILE=REGISTRY 16.138.6/RID  
L3 ( 3795)SEA FILE=REGISTRY 16.145.6/RID  
L4 ( 94421)SEA FILE=REGISTRY 16.136.10/RID  
L5 ( 60178)SEA FILE=REGISTRY 333.84.17/RID  
L6 ( 1107)SEA FILE=REGISTRY 333.94.9/RID  
L7 ( 122962)SEA FILE=REGISTRY 333.79.30/RID  
L8 ( 344101)SEA FILE=REGISTRY L2 OR L3 OR L4 OR L5 OR L6 OR L7  
L9 STR  
L10 STR  
L11 STR  
L12 STR  
L13 STR  
L14 STR  
L15 SCR 1918 OR 2043 OR 2049 OR 2127 OR 2040 OR 1929  
L16 143956 SEA FILE=REGISTRY SUB=L8 SSS FUL (L9 OR L10 OR L11 OR L12  
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L17 FILE 'REGISTRY' ENTERED AT 12:53:28 ON 26 JAN 2004  
50 S L1 SSS SAM SUB=L16

L18 FILE 'LREGISTRY' ENTERED AT 12:58:48 ON 26 JAN 2004  
STRUCTURE

L19 FILE 'REGISTRY' ENTERED AT 13:02:26 ON 26 JAN 2004  
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L20 2046 S L18 SSS FUL SUB=L16  
SAVE L20 EGW636B/A  
L21 1 S 50-81-7/RN  
L22 2046 S L20 NOT L21

L23 FILE 'HCAPLUS' ENTERED AT 13:11:39 ON 26 JAN 2004  
422532 S ANTIOXID? OR (ANTI OR INHIBIT? OR HINDER? OR IMPED? OR  
L24 2394036 S POLYM? OR COPOLYM? OR HOMOPOLYM? OR TERPOLYM? OR RESIN?  
L25 17969 S L23 (3A) L24  
L26 156 S L22 AND L25  
L27 9471 S NONPHENOL? OR NON(A)PHENOL OR ?PHTHALID?

Transcript 1  
Substructure  
M=O, E=oxygen, R=H

L28           1 S L26 AND L27  
 L29       110 S L22 AND L27  
 L30       12 S L29 AND L24  
 L31       3 S L22 AND L23 AND L27  
           ACT EGW636A/A

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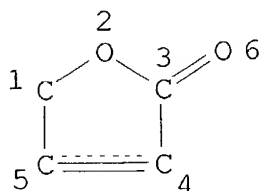
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 L33 (       3795)SEA FILE=REGISTRY 16.145.6/RID  
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 L35 (       60178)SEA FILE=REGISTRY 333.84.17/RID  
 L36 (       1107)SEA FILE=REGISTRY 333.94.9/RID  
 L37 (       122962)SEA FILE=REGISTRY 333.79.30/RID  
 L38 (       344101)SEA FILE=REGISTRY L32 OR L33 OR L34 OR L35 OR L36 OR L37  
 L39           STR  
 L40           STR  
 L41           STR  
 L42           STR  
 L43           STR  
 L44           STR  
 L45           SCR 1918 OR 2043 OR 2049 OR 2127 OR 2040 OR 1929  
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 L48 (       384096)SEA FILE=HCAPLUS ANTIOXID? OR (ANTI OR INHIBIT? OR HINDER  
 L49 (       142977)SEA FILE=HCAPLUS PRESERV?  
 L50 (       1337590)SEA FILE=HCAPLUS STABILIZ? OR STABILIS? OR STABIL? OR STA  
 L51 (       13750)SEA FILE=HCAPLUS L47 AND L48  
 L52 (       3398)SEA FILE=HCAPLUS L47 AND L49  
 L53 (       17400)SEA FILE=HCAPLUS L47 AND L50  
 L54       189 SEA FILE=HCAPLUS L51 AND L52 AND L53

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L55           2 S L54 AND L22  
 L56       16 S L30 OR L31 OR L55  
 L57       43 S L26 AND L50  
 L58       43 S L57 NOT L56  
           SAVE L26 EGW636C/A

=> d que stat 122

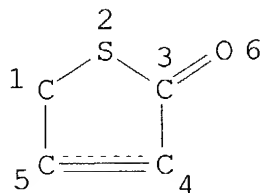
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 L5 (       60178)SEA FILE=REGISTRY 333.84.17/RID  
 L6 (       1107)SEA FILE=REGISTRY 333.94.9/RID  
 L7 (       122962)SEA FILE=REGISTRY 333.79.30/RID  
 L8 (       344101)SEA FILE=REGISTRY L2 OR L3 OR L4 OR L5 OR L6 OR L7  
 L9           STR



NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RSPEC I  
 NUMBER OF NODES IS 6

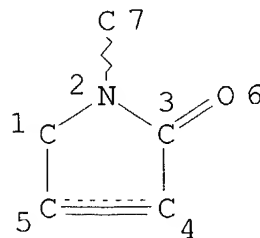
STEREO ATTRIBUTES: NONE  
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NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
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STEREO ATTRIBUTES: NONE  
 L11 STR



NODE ATTRIBUTES:  
 NSPEC IS RC AT 7

NUMBER OF NODES IS 7

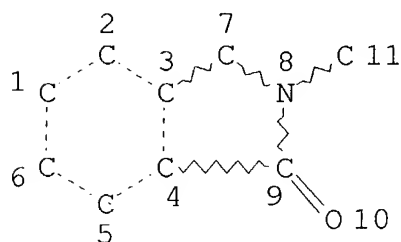
The diagram shows a cyclohexane ring with atoms numbered 1 through 10. Atoms 1, 2, 3, 4, 5, and 6 form the ring, connected by dashed lines. Atoms 7, 8, 9, and 10 are part of a side chain attached to atom 3. The side chain consists of atom 7 (CH) connected to atom 8 (O) via a wavy line, atom 8 connected to atom 9 (C) via a wavy line, and atom 9 connected to atom 10 (O) via a double bond. Atoms 7 and 9 are also connected to the ring at atom 3 via wavy lines.

NUMBER OF NODES IS 10

NUMBER OF NODES IS 10

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STEREO ATTRIBUTES: NONE
L14                STR
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## NODE ATTRIBUTES:

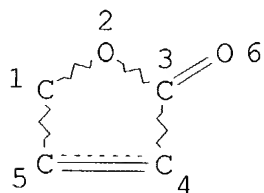
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 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RSPEC I  
 NUMBER OF NODES IS 11

## STEREO ATTRIBUTES: NONE

L15 SCR 1918 OR 2043 OR 2049 OR 2127 OR 2040 OR 1929  
 L16 143956 SEA FILE=REGISTRY SUB=L8 SSS FUL (L9 OR L10 OR L11 OR  
 L12 OR L13 OR L14) NOT L15  
 L18 STR



## NODE ATTRIBUTES:

CONNECT IS E2 RC AT 4  
 CONNECT IS E2 RC AT 5  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RSPEC I  
 NUMBER OF NODES IS 6

## STEREO ATTRIBUTES: NONE

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 L21 1 SEA FILE=REGISTRY 50-81-7/RN  
 L22 2046 SEA FILE=REGISTRY L20 NOT L21

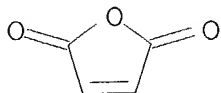
=> d 156 1-16 cbib ab hitstr hitind

L56 ANSWER 1 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

2003:892770 Document No. 139:381498 Phthalazinone derivatives useful as inhibitors of PARP (i.e., poly(ADP-ribose) **polymerase**) and their preparation, pharmaceutical compositions, and use, e.g., as potentiators in the treatment of cancer. Martin, Niall Morrison Barr; Smith, Graeme Cameron Murray; Eversley, Penny Jane; Cockcroft, Xiao-Ling Fan; Kerrigan, Frank; Hoare, Janet; Dixon, Lesley (Kudos Pharmaceuticals Limited, UK; Maybridge PLC). PCT Int. Appl. WO 2003093261 A1 20031113, 131 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-GB1817 20030429. PRIORITY: US 2002-PV376497 20020430.

AB Title compds. I and their isomers, salts, solvates, chem. protected forms, and prodrugs thereof, are useful as pharmaceuticals, in particular, for the treatment of diseases ameliorated by inhibiting the activity of PARP, i.e., poly(ADP-ribose) **polymerase** [wherein: A and B together = optionally substituted, fused arom. ring; R1 = C5-7 aryl group substituted in the meta position by the group R2, and optionally further substituted; R2 = 5- or 6-membered lactams or cyclic ureas, bound at the amide N, or 5- or 6-membered cyclic imides, including piperazine-2,6-diones, bound at the imide N]. I are claimed as useful for therapy, in human or animals, and particularly for 3 cases: (1) inhibiting the activity of PARP, preferably to maximize DNA repair inhibition; (2) in treatment of a variety of disorders, including cardiovascular conditions, ischemia, neurotoxicity, and inflammation; and (3) as an adjunct in cancer therapy, or for potentiating tumor cells for treatment with ionizing radiation or chemotherapeutics. Examples include 43 preps. of specific compds. I. For instance, **phthalide** was cyclocondensed with 3-nitrobenzaldehyde to give 2-(3-nitrophenyl)indan-1,3-dione, which was re-cyclized with hydrazine to give 4-(3-aminobenzyl)-2H-phthalazin-1-one. This amine was cyclized with succinic anhydride in refluxing acetic acid to give invention compd. II, a preferred compd. In a test for inhibition of HeLa cellular PARP in vitro, II had an IC50 value of < 0.03 .mu.M, vs. 7.2 .mu.M for the base structure, 1(2H)-phthalazinone. In a test for potentiation of the alkylating agent Me methanesulfonate (MMS) against HeLa cells in vitro, several compds., including II, had potentiating factors (PF50) of .gtoreq.1 at 200 nM.

IT 108-31-6, Maleic anhydride, reactions  
(starting material; prepn. of phthalazinone derivs. as PARP  
inhibitors)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



IC ICM C07D401-10  
ICS C07D403-10; C07D495-04; A61K031-502; A61P031-20  
CC 28-15 (Heterocyclic Compounds (More Than One Hetero Atom))  
Section cross-reference(s): 1, 63  
IT 9055-67-8, Poly(ADP-ribose) **polymerase**  
(inhibitors; prepn. of phthalazinone derivs. as PARP inhibitors)  
IT 85-42-7, Hexahydrophthalic anhydride 85-44-9, Phthalic anhydride  
87-41-2, **Phthalide** 99-61-6, 3-Nitrobenzaldehyde  
108-30-5, Succinic anhydride, reactions **108-31-6**, Maleic  
anhydride, reactions 108-55-4, Glutaric anhydride 117-40-8,  
5-Methylnorborn-5-ene-2,3-dicarboxylic anhydride 119-67-5,  
2-Carboxybenzaldehyde 616-02-4, 3-Methylfuran-2,5-dione  
641-70-3, 3-Nitrophthalic anhydride 766-39-2, Dimethylmaleic  
anhydride 1131-15-3, 3-Phenyldihydrofuran-2,5-dione 3479-47-8,  
N.alpha.-(Benzyloxycarbonyl)-L-aspartic acid 4-benzyl ester  
4100-80-5, Methylidihydrofuran-2,5-dione 4408-64-4 4462-96-8,  
Cyclobutane-1,2-dicarboxylic acid anhydride 4635-59-0,  
4-Chlorobutyryl chloride 5617-74-3, 3-Oxabicyclo[3.1.0]hexane-2,4-  
dione 10489-75-5, 3,6-Dithia-3,4,5,6-tetrahydrophthalic anhydride  
10500-34-2, 3-(Hex-2-enyl)dihydrofuran-2,5-dione 16588-34-4,  
4-Chloro-3-nitrobenzaldehyde 17347-61-4, 3,3-Dimethyldihydrofuran-  
2,5-dione 19438-61-0, 4-Methylphthalic anhydride 19544-43-5,  
3-Benzyldihydrofuran-2,5-dione 31680-08-7, 4-Methoxy-3-  
nitrobenzaldehyde 36122-35-7, Phenylmaleic anhydride 42482-06-4,  
3-(Oct-2-enyl)dihydrofuran-2,5-dione 42564-51-2,  
4-Fluoro-3-nitrobenzaldehyde 62953-73-5, 1-  
(Carboxymethyl)cyclopentanecarboxylic acid 64545-80-8,  
(Non-2-enyl)dihydro-2,5-furandione 67305-69-5,  
4-Benzylmorpholine-2,6-dione 75542-33-5, 2-Phenyl-2-propylsuccinic  
acid 623578-58-5, 4-[3,5-Bis(trifluoromethyl)phenyl]-3a,4,7,7a-  
tetrahydroisobenzofuran-1,3-dione  
(starting material; prepn. of phthalazinone derivs. as PARP  
inhibitors)

**polymer oxidation** using non-phenolic **antioxidants**. Wang, Qi; Nagy, Sandor (USA). U.S. Pat. Appl. Publ. US 2003083405 A1 20030501, 6 pp., Cont.-in-part of U.S. Ser. No. 223,710. (English). CODEN: USXXCO. APPLICATION: US 2002-65636 20021105. PRIORITY: US 1998-223710 19981230.

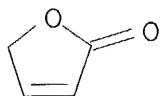
AB The oxidn. of a **polymer** is inhibited by adding to the **polymer** about 0.005-10 phr of an **antioxidant** of I (in non-**polymeric** form) type (E is O, S, or N, R is H, R', OR', SR', OP(R')<sub>2</sub>, COR', each R is independently selected from R<sub>1</sub>, alkylenyl from C1 to C12, aminoalkyl from C1 to C12, and hydroxyalkyl from C1 to C12, R' is alkyl from C1 to C12 or aryl, alkylaryl, or aralkyl from C6 to C12, R' is G, GO, GS, GNH, NHG, NHGO, NHGNH, NHGS, OG, OGO, OGNH, OGS, where G is alkylenyl from C7 to C12, or arylalkylenyl from C7 to C12, m is 0 if E is O or S and is 1 if E is N, and two R groups can join from an alicyclic ring or an arom. ring or an R group and an R<sub>1</sub> group can join to form an alicyclic ring). The **polymer** can be PVC, a polycarbonate, a polyether, polyethylene, polypropylene, or a mixt. thereof when the **antioxidant** is not **phthalide** and can be PVC, a polycarbonate, a polyether, or a mixt. thereof when the **antioxidant** is **phthalide**.

IT 497-23-4D, 2(5H)Furanone, derivs.

(nonphenolic antioxidants for use in **polymer** compns.)

RN 497-23-4 HCAPLUS

CN 2(5H)-Furanone (8CI, 9CI) (CA INDEX NAME)



IC ICM C08K005-00

NCL 524081000; 524084000; 524104000; 524113000; 524116000; 524094000

CC 37-2 (Plastics Manufacture and Processing)

ST furanone pyrrolinone **nonphenolic antioxidant**  
**polymer** plastic compn

IT **Antioxidants**

(nonphenolic antioxidants for use in **polymer** compns.)

IT Polycarbonates, uses  
Polyethers, uses

(nonphenolic antioxidants for use in **polymer** compns.)

IT 87-41-2, **Phthalide** 497-23-4D, 2(5H)Furanone, derivs. 4031-15-6D, 3-Pyrrolin-2-one, derivs. 22122-36-7, 3-Methyl-2(5H)furanone 69556-70-3, 4-Methoxy-2(5H)furanone

159159-41-8D, Thiophenone, derivs. 201815-03-4, HP-136  
(nonphenolic antioxidants for use in  
polymer compns.)

IT 9002-86-2, PVC 9002-88-4, Polyethylene 9003-07-0, Polypropylene  
(nonphenolic antioxidants for use in  
polymer compns.)

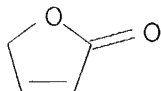
L56 ANSWER 3 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
1999:161734 Document No. 130:267852 Thermal degradation studies of  
alternating **copolymers**: VI. Degradation of the alternating  
**copolymer** of allyl acetate and maleic anhydride: thermal  
analysis and product analysis studies. McNeill, Ian C.; Ahmed,  
Shafique; Gorman, James G. (Polymer Research Group, Department of  
Chemistry, University of Glasgow, Glasgow, G12 8QQ, UK). Polymer  
Degradation and Stability, 63(2), 265-271 (English) 1999. CODEN:  
PDSTDW. ISSN: 0141-3910. Publisher: Elsevier Science Ltd..

AB The alternating **copolymer** of allyl acetate and maleic  
anhydride was prepd. by the free radical route at 60.degree.C.  
Temp. ranges of decompn. under programmed heating have been detd. by  
TGA and thermal volatilization anal. (TVA). The TVA method has also  
been used to establish the amts. of the main product fractions in  
terms of volatility. The largest fraction comprises volatile gases  
and liqs. and these have been characterized by IR spectroscopy, mass  
spectrometry, and GC-MS, the most important components being acetic  
acid and carbon dioxide. Temp. regions for prodn. of the most  
important volatile products have been established by MS selective  
ion monitoring during the degrdn. The principal constituents of the  
tar/wax product fraction have also been characterized. Unlike  
alternating **copolymers** of maleic anhydride with vinyl  
acetate or isopropenyl acetate, the allyl acetate **copolymer**  
shows some decompn. of the maleic anhydride units before acetic acid  
is released. Extensive fragmentation of the modified chain  
structure, however, does not occur below 350.degree.C.

IT 497-23-4, 2(5H)-Furanone  
(in thermal degrdn. products of allyl acetate-maleic anhydride.  
alternating **polymer**)

RN 497-23-4 HCAPLUS

CN 2(5H)-Furanone (8CI, 9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)  
ST thermal degrdn product alternating **polymer**; maleic  
anhydride alternating **polymer** thermal degrdn; allyl

acetate alternating **polymer** thermal degrdn

IT **Polymer** degradation

(thermal; of allyl acetate-maleic anhydride alternating **polymer**)

IT 64-19-7, Acetic acid, formation (nonpreparative) 79-10-7,  
2-Propenoic acid, formation (nonpreparative) 87-41-2,  
**Phthalide** 95-63-6, 1,2,4-Trimethylbenzene 100-42-5,  
formation (nonpreparative) 102-25-0, 1,3,5-Triethylbenzene  
107-86-8, 3-Methyl-2-butenal 108-29-2 108-38-3, formation  
(nonpreparative) 108-67-8, 1,3,5-Trimethylbenzene, formation  
(nonpreparative) 108-88-3, Toluene, formation (nonpreparative)  
124-38-9, Carbon dioxide, formation (nonpreparative) 447-53-0,  
1,2-Dihydronaphthalene **497-23-4**, 2(5H)-Furanone 531-59-9  
591-12-8 606-23-5, 1,3-Indandione 622-96-8, 4-Methylethylbenzene  
765-83-3, Isopropylidenecyclopentane 767-58-8, 1-Methylindan  
767-60-2, 3-Methyl-1H-indene 930-30-3, 2-Cyclopenten-1-one  
934-74-7, 1-Ethyl-3,5-dimethylbenzene 1120-73-6,  
2-Methyl-2-cyclopentenone 1121-05-7, 2,3-Dimethyl-2-cyclopentenone  
1515-78-2, 1-Phenylbutadiene 1758-88-9, 1-Ethyl-2,5-  
dimethylbenzene 2234-20-0, 2,4-Dimethylstyrene 2758-18-1,  
3-Methyl-2-cyclopentenone 4276-45-3, 3-Isopropylcyclopentene  
4706-90-5, 1-Isopropyl-3,5-dimethylbenzene 5379-20-4,  
3,5-Dimethylstyrene 17059-48-2, 1,6-Dimethylindan 20895-42-5  
28631-88-1, Methylcyclopentanone 28790-86-5, 2,3,4-Trimethyl-2-  
cyclopentenone 39513-75-2 39831-51-1 53735-43-6 73623-82-2  
78428-99-6 135269-08-8 222187-59-9 222187-60-2  
(in thermal degrdn. products of allyl acetate-maleic anhydride  
alternating **polymer**)

IT 107948-06-1, Allyl acetate-maleic anhydride alternating  
**polymer**

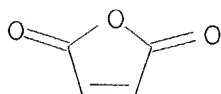
(thermal degrdn. and degrdn. product anal. of)

L56 ANSWER 4 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1996:392042 Document No. 125:88658 Process for the preparation of  
**stable** water based stock solutions of crosslinked lower  
alkyl vinyl ether and maleic anhydride copolymers and hydrogel  
product of the process. Kwak, Yoon T.; Kopolow, Stephen L.; Login,  
Robert B. (ISP Investments Inc., USA). U.S. US 5516828 A 19960514,  
4 pp., Division of U.S. Ser. No. 359, 096. (English). CODEN:  
USXXAM. APPLICATION: US 1995-528382 19950913. PRIORITY: US  
1994-359096 19941219.

AB This invention relates to **stable** colorless concs. and  
stock solns. of 1-5% crosslinked lower alkyl vinyl ether-maleic  
anhydride copolymers having a Brookfield viscosity of up to about  
25,000 cps and to the process for their prepn. The alkyl vinyl  
ethers are those of C1-C4, preferably Me and Et vinyl ethers. The  
crosslinking agents used are .alpha.,.omega.-unsatd. C6-C8  
alkadienes or divinylbenzene.

IT 108-31-6D, Maleic anhydride, polymers with alkyl vinyl ethers, alkadiene-crosslinked  
(prepn. of **stable** water-based stock solns. of crosslinked lower alkyl vinyl ether-maleic anhydride copolymers and hydrogel product of the process)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



IC ICM C08K003-10  
NCL 524401000  
CC 38-3 (Plastics Fabrication and Uses)  
Section cross-reference(s): 46, 62, 63  
ST **stable** aq thickener maleic anhydride copolymer; vinyl ether maleic anhydride copolymer soln; diene crosslinked maleic anhydride copolymer thickener  
IT 128-37-0, BHT, uses 1406-18-4, Vitamin E  
(**antioxidant**; prepn. of **stable** water-based stock solns. of crosslinked lower alkyl vinyl ether-maleic anhydride copolymers and hydrogel product of the process)  
IT 108-31-6D, Maleic anhydride, polymers with alkyl vinyl ethers, alkadiene-crosslinked 26711-22-8D, Ethyl vinyl ether-maleic anhydride copolymer, alkadiene-crosslinked 178695-36-8  
(prepn. of **stable** water-based stock solns. of crosslinked lower alkyl vinyl ether-maleic anhydride copolymers and hydrogel product of the process)  
IT 532-32-1, Sodium benzoate  
(**preservative**; prepn. of **stable** water-based stock solns. of crosslinked lower alkyl vinyl ether-maleic anhydride copolymers and hydrogel product of the process)  
L56 ANSWER 5 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
1995:869802 Document No. 123:342855 Laminated packaging films containing polyethylene. Fujii, Toshio; Kato, Kazuhiro; Kondo, Toyomitsu (Mitsubishi Kagaku KK, Japan). Jpn. Kokai Tokkyo Koho JP 07195636 A2 19950801 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1993-349466 19931228.  
AB The title films comprise outer layers, middle layers, and inner layers, in which the outer and inner layers comprise polyethylene compns. with d. 0.920-0.935 g/cm<sup>3</sup> and extrusion coeff. (EC) 6.5-14 g<sup>2</sup>/10 min and the contents of phenol-based **antioxidants** .1toreq.100 ppm. The films are useful for packaging of food, etc.

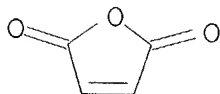
Thus, outer and inner layer-forming polyethylene (d. 0.925 g/cm<sup>3</sup>, EC 9.5 g2/10 min) and middle layer-forming nylon 6 were laminated using adhesive layers comprising maleated polyethylene to give a film showing good transparency, heat resistance, cutting property, and adhesion strength. The film did not show discoloration by **preservation** at 25.degree. under dark for 2 wk.

IT 108-31-6DP, Maleic anhydride, reaction products with polyethylene

(adhesives; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

RN 108-31-6 HCAPLUS

CN 2,5-Furandione (9CI) (CA INDEX NAME)



IC ICM B32B027-32

ICS B32B007-02; B32B027-18

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 17

ST packaging laminated film polyethylene polyamide; phenolic **antioxidant** packaging film polyethylene; discoloration prevention packaging film polyethylene; heat resistance polyethylene film packaging; transparency polyethylene film packaging; extrusion coeff polyethylene film packaging

IT Discoloration prevention

Food

Heat-resistant materials

Transparent materials

(laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT Plastics, film

Plastics, laminated

(laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT Polyamides, uses

(middle layers; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance,



and cutting property)

IT **Antioxidants**

(phenol-based; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT Phenols, miscellaneous

(comps., **antioxidants**; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT Packaging materials

(films, laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT 9002-88-4DP, Polyethylene, maleated

(adhesive layers; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT 108-31-6DP, Maleic anhydride, reaction products with polyethylene

(adhesives; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT 25038-54-4, Nylon 6, uses

(middle layers; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

IT 9002-88-4, Polyethylene

(outer layers; laminated packaging films contg. polyethylene with low contents of phenol-based **antioxidants** at outer and inner layers with good **stability**, heat resistance, and cutting property)

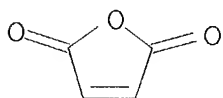
L56 ANSWER 6 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1993:498163 Document No. 119:98163 Microcapsule-containing UV-curable printing ink compositions. Totani, Kazuo; Nakanishi, Akira; Wakata, Kazuyoshi; Kawano, Kazuhiko; Shioi, Syunsuke; Furukawa, Hiroiti; Shimamura, Yasuo; Tozaki, Eishun (Kanzaki Paper Mfg. Co., Ltd., Japan). Ger. Offen. DE 4218999 A1 19921217, 18 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1992-4218999 19920610. PRIORITY: JP 1991-138791 19910611; JP 1991-153036 19910625; JP 1991-341492 19911224.

AB The title compns. contain microcapsules, photoinitiators, and

(hydrogenated) polybutadiene (I)/(meth)acrylates, the alkenoates  $\text{CH}_2:\text{CR}_1\text{CO}(\text{OCHR}_2\text{CHR}_3)\text{nOR}_4$  ( $\text{R}_1 = \text{H}, \text{Me}; \text{R}_2, \text{R}_3 = \text{H}$  and/or  $\text{Me}; \text{R}_4 = \text{aryl}; \text{n} \leq 1$ ), or the alkenoates  $\text{CH}_2:\text{CR}_1\text{CO}_2\text{CH}_2\text{CHOHCH}_2\text{OR}_5$  ( $\text{R}_5 = \text{C}_{1\text{to}34} \text{ alkyl, aryl}$ ). A mixt. of a microencapsulated 3,3-bis(2-methyl-1-octyl-3-indolyl)phthalide-benzyltoluene compn. 100, 1:1 mixt. of OH-terminated I-TDI-2-hydroxyethyl acrylate urethane and dipropylene glycol diacrylate 300, and benzoin Me ether 10 parts was used with an elec. typewriter to print on a sheet coated with a Zn bis(.alpha.-methylbenzyl)salicylate-contg. compn. to give very sharp prints.

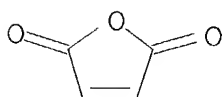
- IT 108-31-6D, 2,5-Furandione, reaction products with hydroxyethyl acrylate and hydroxyl-terminated polybutadiene, **polymers** with acrylate esters (binders, for photocurable microcapsule-contg. printing inks)
- RN 108-31-6 HCAPLUS
- CN 2,5-Furandione (9CI) (CA INDEX NAME)



- IC ICM B01J013-14
- ICS C09D011-02; C08F002-50; C08F020-28; C08L013-00
- ICA C09K019-02; C09K009-00; C09K015-00; A01N025-28; C09B011-02; C09B011-04; C09B011-28; C09B021-00; C09B057-00
- CC 42-12 (Coatings, Inks, and Related Products)  
Section cross-reference(s): 74
- IT Inks  
(printing, photocurable, microencapsulated chromogen-contg., acrylic **polymer** binders for)
- IT 108-31-6D, 2,5-Furandione, reaction products with hydroxyethyl acrylate and hydroxyl-terminated polybutadiene, **polymers** with acrylate esters 814-68-6D, Acryloyl chloride, reaction products with hydroxyl-terminated polybutadiene, **polymers** with acrylate esters 818-61-1D, urethanes with TDI and hydroxyl-terminated polybutadiene, **polymers** with acrylate esters 9003-17-2D, Polybutadiene, hydroxyl-terminated, urethanes with TDI and hydroxyethyl acrylate, **polymers** with acrylate esters 13048-33-4D, **polymers** with polybutadiene acrylates 16969-10-1D, 2-Hydroxy-3-phenoxypropyl acrylate, **polymers** with polybutadiene acrylates 26471-62-5D, TDI, urethanes with hydroxyethyl acrylate and hydroxyl-terminated polybutadiene, **polymers** with acrylate esters 57472-68-1D, Dipropylene glycol diacrylate, **polymers** with polybutadiene acrylates 101232-65-9D, **polymers** with polybutadiene acrylates 148977-03-1

148977-04-2 148977-06-4 149001-50-3 149001-51-4 149115-24-2  
(binders, for photocurable microcapsule-contg. printing inks)

L56 ANSWER 7 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
1989:565459 Document No. 111:165459 Electrically conductive composites  
of polyacetylene and high-nitrile **resins** and their  
preparation. Benton, Kenneth C.; Weinert, Raymond J., Jr.; Ball,  
Lawrence E. (Standard Oil Co., USA). U.S. US 4828756 A 19890509, 6  
pp. Cont. of U.S. Ser. No. 933,491, abandoned. (English). CODEN:  
USXXAM. APPLICATION: US 1988-143541 19880113. PRIORITY: US  
1985-743327 19850615; US 1986-933491 19861121.  
AB The composite comprises a high-nitrile **polymer** film matrix  
25-96 and a conductive alkyne **polymer** 4-75 wt.%, and a  
dopant. The composite is prepd. by impregnating a film of nitrile  
**polymer** or high-nitrile **copolymer** with a  
Ziegler-type catalyst comprising an alkylaluminum compd. and an  
alkyl, alkyl halide, alkoxide, or oxyhalide of a Group IVB and/or  
Group VB metal, exposing the catalyst-impregnated **polymer**  
film to an acetylenic monomer under **polymn.** conditions to  
form a composite, and exposing the composite to a dopant.  
IT 108-31-6, Maleic anhydride, uses and miscellaneous  
(elec. conductive composites from polyacetylenes and high-nitrile  
**resins** prepd. from)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



IC ICM H01B001-20  
NCL 252518000  
CC 76-2 (Electric Phenomena)  
Section cross-reference(s): 35, 38, 67  
ST polyacetylene nitrile **resin** composite elec conductor;  
doped polyacetylene nitrile **resin** composite conductor  
IT Electric conductors  
(polyacetylene-high-nitrile **resin** composites, prepn.  
of)  
IT Rubber, synthetic  
(EPDM, elec. conductive composites from polyacetylenes and  
high-nitrile **resins** prepd. from)  
IT **Polymerization** catalysts  
(Ziegler, alkylaluminum-transition metal compd., for prepn. of  
polyacetylene-high-nitrile **resin** elec. conductive  
composites)

- IT 75-24-1, Trimethylaluminum 96-10-6, Diethylaluminum chloride, uses and miscellaneous 97-93-8, Triethylaluminum, uses and miscellaneous 100-99-2, Triisobutylaluminum, uses and miscellaneous 546-68-9, Tetra(isopropyl)titanate 1116-73-0, Tri-n-hexylaluminum 1191-15-7, Diisobutylaluminum hydride 1271-19-8, Dicyclopentadienyltitanium dichloride 5593-70-4, Tetra(n-butyl)titanate 7425-80-1, Tetra(isobutyl)titanate 7727-18-6, Vanadium oxytrichloride 12075-68-2, Ethylaluminum sesquichloride 12636-72-5 13476-99-8 88803-98-9  
(catalysts contg., for prepn. of polyacetylene-high-nitrile resin elec. conductive composites)
- IT 25067-58-7P, Polyacetylene 28391-48-2P, Poly(methylacetylene) 30523-92-3P, Poly(1,6-heptadiyne) 37766-48-6P 37956-36-8P 53210-86-9P, Polycyclohexylacetylene  
(elec. conductive composites from high-nitrile resins and, prepn. of)
- IT 3481-12-7, Sodium naphthalide 4216-48-2, Potassium naphthalide 7308-67-0, Lithium naphthalide 7553-56-2, Iodine, uses and miscellaneous 7601-90-3, Perchloric acid, uses and miscellaneous 7664-93-9, Sulfuric acid, uses and miscellaneous 7783-70-2, Antimony pentafluoride 7784-36-3, Arsenic pentafluoride 10241-05-1, Molybdenum pentachloride 13283-01-7, Tungsten hexachloride  
(elec. conductive composites from polyacetylenes and high-nitrile resins doped with)
- IT 74-85-1, Ethylene, uses and miscellaneous 75-01-4, Vinyl chloride, uses and miscellaneous 75-02-5, Vinyl fluoride 75-35-4, Vinylidene chloride, uses and miscellaneous 75-38-7, Vinylidene fluoride 77-73-6, Dicyclopentadiene 78-79-5, 2-Methyl-1,3-butadiene, uses and miscellaneous 80-62-6, Methyl methacrylate 95-13-6, Indene 96-33-3, Methyl acrylate 98-83-9, .alpha.-Methylstyrene, uses and miscellaneous 100-42-5, Styrene, uses and miscellaneous 105-76-0, Dibutyl maleate 106-98-9, 1-Butene, uses and miscellaneous 106-99-0, 1,3-Butadiene, uses and miscellaneous 108-05-4, Vinyl acetate, uses and miscellaneous 108-31-6, Maleic anhydride, uses and miscellaneous 111-63-7, Vinyl stearate 115-07-1, Propylene, uses and miscellaneous 115-11-7, Isobutylene, uses and miscellaneous 126-99-8, 2-Chloro-1,3-butadiene 140-88-5, Ethyl acrylate 141-05-9, Diethyl maleate 141-32-2, Butyl acrylate 142-90-5, Lauryl methacrylate 498-66-8, Norbornene 504-60-9, 1,3-Pentadiene 513-81-5, 2,3-Dimethyl-1,3-butadiene 592-41-6, 1-Hexene, uses and miscellaneous 592-48-3, 1,3-Hexadiene 593-60-2, Vinyl bromide 622-97-9, p-Methylstyrene 623-91-6, Diethyl fumarate 694-91-7, 5-Methylene-2-norbornene 926-56-7, 4-Methyl-1,3-pentadiene 1746-23-2, p-tert-Butylstyrene 3066-71-5, Cyclohexyl acrylate 4549-74-0, 3-Methyl-1,3-pentadiene 16219-75-3, 5-Ethylidene-2-norbornene

(elec. conductive composites from polyacetylenes and high-nitrile **resins** prepd. from)

- IT 25014-41-9P, Polyacrylonitrile 25067-61-2P,  
**Polymethacrylonitrile** 26678-76-2P, Polytetracyanoethylene  
28155-86-4P 29439-13-2P, Poly(.alpha.-methyleneglutaronitrile)  
71586-73-7P 123011-94-9P  
(elec. conductive composites from polyacetylenes and, prepn. of)  
IT 74-85-1  
(rubber, EPDM, elec. conductive composites from polyacetylenes  
and high-nitrile **resins** prepd. from)

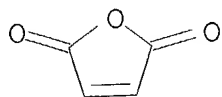
L56 ANSWER 8 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1988:456757 Document No. 109:56757 Thermosetting alkyd **resin**  
lithographic printing inks for metals. Kitani, Yasuo; Yoshida, Yuji  
(Mitsubishi Petrochemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho  
JP 63000367 A2 19880105 Showa, 10 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 1986-81863 19860409.

- AB The title storage-stable inks, thermally cured to products with good  
discoloration resistance, flexural resistance, hardness, gloss and  
smoothness, comprise 50-90 parts oil-modified alkyd **resins**  
(A) contg. 30-80% oils, 10-50 parts polyether polyol (meth)acrylates  
[B; liq. at 20.degree., sol. in the alkyd **resins**, av. mol.  
wt. [Ma; based on per (meth)acryloxy] .ltoreq. 500] [prepd. from  
polyols derived from an initiator contg. n **nonphenolic** OH  
and m mol ethylene oxide and/or propylene oxide (per mol initiator)  
and (meth)acrylic acid with n = 2-6, m/n 1-6], 0-20 parts  
(meth)acrylic esters (C) having .gtoreq.3 (meth)acryloxy groups and  
Ma .ltoreq.300 and 0-0.01% (based on 100 parts A + B + C) Co- or  
Mn-contg. driers. Thus, a varnish contg. A (fatty acids of  
dehydrated castor oil, phthalic anhydride, glycerol, and neopentyl  
glycol) 60, trimethylolpropane-ethylene oxide adduct trimethacrylate  
40 and TiO2 100 parts and showing good storage stability after 1 wk  
storage at 50.degree. or 5.degree. was spread on a steel plate,  
printed, and dried at 150.degree. for 10 min to form a tack-free  
product with good flexural resistance (JIS K 5400), hardness (JIS K  
5025), and nonyellowing after heating at 150.degree. for 0.5 h.

- IT **108-31-6D**, 2,5-Furandione, reaction products with  
alloocimene, **polymers** with fatty acids, polyols and  
polyether polyol (meth)acrylates  
(manuf. of varnishes contg., storage-stable, for lithog. printing  
inks for metals)

RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



- IC ICM C09D003-66  
 CC 42-12 (Coatings, Inks, and Related Products)  
 Section cross-reference(s): 55, 56, 74  
 ST oil modified alkyd **resin** ink; polyether polyol  
 methacrylate ink; **polymethacryloxy** compd alkyd  
**resin** ink; storage stability alkyd **resin** ink;  
 hardness alkyd **resin** ink metal; smoothness alkyd  
**resin** ink metal; gloss alkyd **resin** ink metal;  
 nonyellowing alkyd **resin** ink metal; lithog printing ink  
 metal; polyester polyacrylate lithog thermosetting ink;  
 polyoxyalkylene methacrylate ink  
 IT Metals, uses and miscellaneous  
 (oil-modified alkyd **resin**-contg. inks for,  
 storage-stable, with good discoloration resistance)  
 IT Alkyd **resins**  
 (dehydrated castor oil-based, lithog. printing inks contg.  
 polyether polyol (meth)acrylates and, for metals)  
 IT Alkyd **resins**  
 (linseed oil-based, lithog. printing inks contg. polyether polyol  
 (meth)acrylates and, for metals)  
 IT Inks  
 (lithog., thermosetting, contg. oil-modified alkyd **resin**  
 and polyether polyol (meth)acrylate, storage-stable, with good  
 discoloration resistance, for metals)  
 IT Alkyd **resins**  
 (soybean oil-based, lithog. printing inks contg. polyether polyol  
 (meth)acrylates and, for metals)  
 IT Discoloration prevention  
 (yellowing, of oil-modified alkyd **resin**-polyether  
 polyol (meth)acrylate inks, on metals)  
 IT 7439-96-5D, Manganese, compds. 7440-48-4D, Cobalt, compds.  
 (driers, oil-modified alkyd **resin** printing inks contg.,  
 for metals)  
 IT 108-31-6D, 2,5-Furandione, reaction products with  
 alloocimene, **polymers** with fatty acids, polyols and  
 polyether polyol (meth)acrylates 673-84-7D, reaction products with  
 maleic anhydride, **polymers** with fatty acids, polyols and  
 polyether polyol (meth)acrylates  
 (manuf. of varnishes contg., storage-stable, for lithog. printing  
 inks for metals)  
 IT 29570-58-9D, **polymers** with oil-modified alkyd  
**resins** 62886-89-9D, Aronix M 8060, **polymers** with

oil-modified alkyd **resins** 77866-18-3D, **polymers**  
with oil-modified alkyd **resins** 82727-34-2D,  
**polymers** with oil-modified alkyd **resins**  
115218-20-7D, **polymers** with oil-modified alkyd  
**resins**

(manuf. of varnishes contg., storage-stable, for lithog. printing  
inks, for metals)

- IT 56-81-5DP, Glycerol, **polymers** with dicarboxylic acids,  
fatty acids of oils, and polyether polyol (meth)acrylates  
85-44-9DP, Phthalic anhydride, **polymers** with fatty acids,  
polyols and polyether polyol (meth)acrylates 110-44-1DP, Sorbic  
acid, **polymers** with fatty acids, polyols and polyether  
polyol (meth)acrylates 115-77-5DP, Pentaerythritol,  
**polymers** with dicarboxylic acids, fatty acids of oils, and  
polyether polyol (meth)acrylates 126-30-7DP, Neopentyl glycol,  
**polymers** with dicarboxylic acids, fatty acids, and polyether  
polyol (meth)acrylates 115461-14-8P

(manuf. of, varnishes contg., storage-stable, for lithog.  
printing inks for metals)

- IT 12597-69-2, Steel, uses and miscellaneous  
(oil-modified alkyd **resin**-contg. inks for,  
storage-stable, with good discoloration resistance)

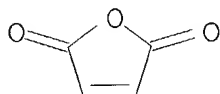
L56 ANSWER 9 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1983:437755 Document No. 99:37755 Benzo[f]isobenzofuran. Mechanistic  
aspects of isobenzofuran formation from acetals and ortho esters.  
Mir-Mohamad-Sadeghy, Bagher; Rickborn, Bruce (Dep. Chem., Univ.  
California, Santa Barbara, CA, 93106, USA). Journal of Organic  
Chemistry, 48(13), 2237-46 (English) 1983. CODEN: JOCEAH. ISSN:  
0022-3263. OTHER SOURCES: CASREACT 99:37755.

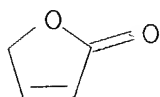
- AB Benzo[f]isobenzofuran (I) is generated as a reactive intermediate  
using the acetals II (R = Me, Et) with carboxylic acid catalysts, as  
shown by the formation of Diels-Alder adducts in the presence of  
dienophiles ranging in reactivity from maleic anhydride to  
norbornene. Results with II generally parallel those obsd. earlier  
with 1-alkoxy-1,3-dihydroisobenzofurans III (R = Me, Et). In  
contrast to the lower homolog IV, which like the acetals gives  
Diels-Alder reactions, the ortho ester V fails to yield  
cycloadducts. With acetal III, various kinetic parameters were  
explored. The rate of II loss is half order in mesitoic acid  
catalyst, and follows 2nd-order behavior with N-phenylmaleimide  
(NPM); i.e., the rate is proportional to the II and NPM concns. The  
reaction of III appears to be zero order in dienophile with the less  
reactive norbornene. An alternative product must be formed  
reversibly under these conditions, and an oligomeric structure is  
suggested for this material. In the absence of dienophile a similar  
rate is obsd., leading eventually to the presumed **polymer**  
in an irreversible reaction. D incorporation in recovered III when

treated for a short time with MeOD and acid catalyst provides evidence for the rapid, reversible formation of isobenzofuran under the usual reaction conditions. This was further substantiated by D incorporation in the Diels-Alder adducts from a reaction of II with norbornene in the presence of MeOD. IV reacts with various acids to give **phthalide** and ring-opened diesters, and these pathways dominate the reactions of V. The different behavior of IV and V in attempted Diels-Alder reactions is due to a higher barrier for formation (or lower stability) of 1-alkoxybenzo[f]isobenzofuran, rather than more facile ring opening of V relative to IV.

IT 108-31-6, reactions 497-23-4  
 (Diels-Alder reaction of, with acetal deriv.)  
 RN 108-31-6 HCAPLUS  
 CN 2,5-Furandione (9CI) (CA INDEX NAME)



RN 497-23-4 HCAPLUS  
 CN 2(5H)-Furanone (8CI, 9CI) (CA INDEX NAME)



CC 22-4 (Physical Organic Chemistry)  
 IT 108-31-6, reactions 110-83-8, reactions 497-23-4  
 498-66-8 762-42-5 3061-65-2  
 (Diels-Alder reaction of, with acetal deriv.)

L56 ANSWER 10 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
 1980:180880 Document No. 92:180880 Asymmetric total synthesis of the antileukemic lignans (+)-trans-burseran and (-)-isostegane. Tomioka, Kiyoshi; Ishiguro, Tsuneo; Koga, Kenji (Fac. Pharm. Sci., Univ. Tokyo, Tokyo, 113, Japan). Journal of the Chemical Society, Chemical Communications (15), 652-3 (English) 1979. CODEN: JCCCAT. ISSN: 0022-4936.

AB (+)-trans-Burseran (I) and (-)-isostegane (II) were prepd. from the chiral butenolide (III) by a highly specific asym. path. III was converted to (+)-deoxypodorhizon (IV) by sequential conjugate addn. of trimethoxybenzaldehyde dithioacetal anion, redn. (Raney Ni), LiAlH<sub>4</sub> redn., NaIO<sub>4</sub> oxidn., and Collins oxidn. Nonphenolic oxidative coupling of IV gave II. Sequential



treatment of IV with  $\text{LiAlH}_4$  and  $\text{p-MeC}_6\text{H}_4\text{SO}_2\text{Cl}$  gave I.

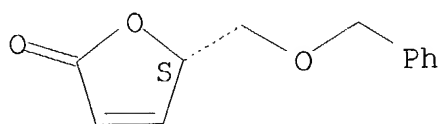
IT 72605-53-9P

(prepn. of, as intermediate in prepn. of antileukemic lignan)

RN 72605-53-9 HCAPLUS

CN 2(5H)-Furanone, 5-[(phenylmethoxy)methyl]-, (5S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



CC 27-6 (Heterocyclic Compounds (One Hetero Atom))

IT 72605-52-8P 72605-53-9P 72605-54-0P 72627-52-2P

72627-53-3P 72627-54-4P 72690-16-5P

(prepn. of, as intermediate in prepn. of antileukemic lignan)

L56 ANSWER 11 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1969:38318 Document No. 70:38318 Accelerated trioxane

**polymerization.** (Yawata Chemical Industry Co., Ltd.). Brit.

GB 1134934 19681127, 25 pp. (English). CODEN: BRXXAA. PRIORITY:

JP 19650122 - 19660406 19660406.

AB A **polymer** or **copolymer** contg. oxymethylene units

was prepd. by **polymg.** trioxane (I) or **copolymg.**

I with a monomer which is either a cyclic ether, a spirocyclic orthocarboxylic ester, a cyclic ester, an aldehyde, a vinyl compd., or a cyclic siloxane in the presence of a cationic catalyst and an accelerator selected from sulfone compds., cyclic carboxylic anhydrides, and cyclic oxalic esters. Thus, tetrahydrothiophene

1,1-dioxide 3.2, I 100, and cyclohexane 100 parts was heated to 70.degree., 0.05 part  $\text{BF}_3 \cdot \text{OEt}_2$  added, the mixt. kept. 2 hrs., and

the **polymn.** stopped by addn. of  $\text{H}_2\text{O}$ . The **polymer**

was washed with  $\text{Me}_2\text{CO}$ , subjected to a hot water treatment, washed by boiling in 2%  $\text{HOCH}_2\text{CH}_2\text{NH}_2$  in  $\text{Me}_2\text{CO}$  and then  $\text{Me}_2\text{CO}$ , the soln.

filtered, and the **polymer** (84 wt. %) dried. The

**polymn.** yield was calcd. as the wt. % based on initial I.

The following sulfones were used as accelerators (compd., parts used and % yield given): 2,5-dihydrothiophene 1,1-dioxide, 2.4, 92.6;

3-methyltetrahydrothiophene 1,1-dioxide, 4.0, 75.2;

3-methyl-2,5-dihydrothiophene 1,1-dioxide, 2.6, 73.6;

2,4-dimethyltetrahydrothiophene 1,1-dioxide, 16.5, 78.9;  $\text{Me}_2\text{SO}_2$

(II), 1.9, 92.2;  $\text{Ph}_2\text{SO}_2$ , 17.5, 68.5; vinyl sulfone, 3.5, 81.88. The

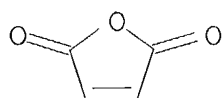
following cyclic carboxylic anhydrides were used (data given as above): diglycolic anhydride, 2.9, 97.4; succinic anhydride, 2.0, 96.4; itaconic anhydride, 2.2, 93.1; maleic anhydride, 9.8, 96.7;

methylnmaleic anhydride, 11.2, 96.2; pyromellitic anhydride, 2.2, 89.3; phthalic anhydride, 14.8, 98.3; tetrahydrophthalic anhydride, 15.2, 91.5; cyclo-hexanedicarboxylic anhydride, 15.2, 86.8; tetrachlorophthalic anhydride, 5.7, 80.3; naphthalic anhydride, 4.0, 78.1. Addn. of 1.8 parts ethylene oxalate gave 85.3%

**polymer.** The accelerator was effective regardless of the catalyst or solvent used. Catalysts used were BF<sub>3</sub>.OEt<sub>2</sub>, p-nitrobenzenediazonium fluoroborate, SnCl<sub>4</sub>, and FeCl<sub>3</sub>. Cyclohexane, heptane, C<sub>6</sub>H<sub>6</sub>, and PhCl were the solvents used, however, the accelerators were also effective in bulk

**polymns.** I was **copolymd.** in the presence of an accelerator and cationic catalyst with ethylene oxide, epichlorohydrin, dioxolane, diethylene glycol formal, 2.5-dihydropyran, 1,4,6-trioxaspiro[4.4]nonane (III), 2-(chloromethyl)-1,4,6-trioxaspiro[4.4]nonane, 1,4,6-trioxaspiro[4.6]undecane, styrene, .alpha.-methylstyrene, indene, H<sub>2</sub>C : CHCN, iso-Bu vinyl ether, .gamma.-butyrolactone, .epsilon.-caprolactone, **phthalide**, acenaphthylene, chloral, or ethylene carbonate. **Terpolymers** were prepd. using either 0.155 part 3,4-epoxy-6-methylcyclohexylmethyl 3,4-epoxy-6-methyl-cyclohexanecarboxylate or 0.97 part ethylene glycol diglycidyl ether with I 100, III 2, II 1.9, and BF<sub>3</sub>.OEt<sub>2</sub> 0.05 part.

IT 108-31-6, uses and miscellaneous  
(promoters, for acidic catalysts for **polymn.** of trioxane)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



IC C08G  
CC 35 (Synthetic High Polymers)  
ST trioxane **polymn** accelerators; accelerators trioxane **polymn**; polytrioxane catalysts; polyoxymethylene catalysts  
IT **Polymerization** catalysts  
(boron fluoride etherate, for trioxane, promoters for co-)  
IT Promoters  
(for boron fluoride etherate catalysts, for **copolymn.** of trioxane)  
IT **Polymerization**  
(of trioxane, solvent effects on co-)  
IT Solvent effects  
(on **copolymn.** of trioxane)

- IT 109-63-7 456-27-9 7646-78-8 7705-08-0, uses and miscellaneous  
(catalysts, for **polymn.** of trioxane)
- IT 71-43-2, uses and miscellaneous 108-90-7, uses and miscellaneous  
110-82-7, uses and miscellaneous 142-82-5, uses and miscellaneous  
(**polymn.** of trioxane in)
- IT 67-71-0 77-77-0 77-79-2 81-84-5 85-42-7 85-43-8 85-44-9  
89-32-7 108-30-5 **108-31-6**, uses and miscellaneous  
117-08-8 126-33-0 127-63-9 616-02-4 872-93-5 1003-78-7  
1193-10-8 2170-03-8 3524-70-7 4480-83-5  
(promoters, for acidic catalysts for **polymn.** of  
trioxane)

L56 ANSWER 12 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1964:67701 Document No. 60:67701 Original Reference No.

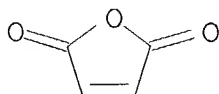
60:11868f-h,11869a-g Oxidation of organic compounds. XXIX. The mechanism of the vapor phase catalytic oxidation of alkylbenzenes and the role of added water and ammonia. Suvorov, B. V.; Rafikov, S. R.; Kagarlitskii, A. D.; Kudinova, V. S. Neftekhim., Akad. Nauk. Turkm. SSR 253-63 (Unavailable) 1963.

- AB cf. CA 58, 3306f; 60 10200a. Oxidn. expts. with air, with and without added H<sub>2</sub>O, on over 40 substances, including mono- and dialkylbenzenes, aromatics with olefinic side chains, CO-, HCO<sub>2</sub>-, and N-contg. aromatic derivs., and some aliphatic compds., were carried out in a flow-type tubular (22 mm. diam., 1200 mm. length) reactor, using as catalysts Sn and Ti vanadates. Analysis of products emphasized sepn. of pure compds. or of identifiable derivs. From MePh, EtPh, and iso-PrPh the main products were BzOH (I), p-benzoquinone (II), and maleic anhydride (III). At flow rates of 33-35 g. hydrocarbon, 2000 l. air (in some cases contg. 100 g. H<sub>2</sub>O) per l. of catalyst per hr. (contact time 0.4 sec.), the yield of I increased to a max. (max. at 380.degree. for MePh, 345.degree. for EtPh, and 340.degree. for iso-PrPh). Max. yields of II and III were obtained at higher temps. Decrease of air-feed ratio or contact time favored production of I, while increase in these variables favored III. Other products in smaller amts. included BzH (IV) from MePh, PhCOME (V) from iso-PrPh, and both from EtPh. Gaseous products were mainly CO and CO<sub>2</sub>. The highest yield of I (68%) was from iso-PrPh. Since reaction appeared to go in steps, the oxidn. of I, II, III, IV, V, hydroquinone (VI), PhOH (VII), PhCH<sub>2</sub>OH (VIII), PhCH:CH<sub>2</sub> (IX), .alpha.-methylstyrene (X), phenylglyoxal (XI), and C<sub>6</sub>H<sub>6</sub> was also studied. From IV, V, VII, IX, X, and XI, the chief products were I, II, and III, although the yields as a rule were lower than from the alkylbenzenes. The relation of max. yield and temp. was similar to that in the hydrocarbon oxidn. C<sub>6</sub>H<sub>6</sub> and PhOH gave II and III. The oxidn. of III gave only combustion products. A more detailed study of the oxidn. of EtPh supported the supposition that the oxidn. can proceed simultaneously in different sequences, each representing distinct steps, e.g., EtPh .fwdarw. IV

.fwdarw. IX .fwdarw. I and EtPh .fwdarw. V .fwdarw. XI .fwdarw. I. Since III is obtained in about the same yield as I, it is concluded that III is formed not only from I but by other routes. VII is not an intermediate in the oxidn. of I to III. C<sub>6</sub>H<sub>6</sub> could not be identified as an intermediate at any stage. For suppression of reactions such as decarbonylation and decarboxylation, the addition of H<sub>2</sub>O as a H and OH donor is helpful. When IV is passed with H<sub>2</sub>O over Sn vanadate at 400-440.degree. in the absence of O, a yield of 65% I is obtained, based on the amt. of IV reacted. C<sub>6</sub>H<sub>6</sub> and PhOH are by-products. Benzil (XII) under similar conditions is >80% converted to a mixt. of IV and I. Since aldehydes and ketones can form free radicals of the type RC(O).cntdot., it is assumed that both IV and XII hydrolyze through this route to I and to I and IV, resp. This effect of H<sub>2</sub>O is retained when O is added to the system, hence H<sub>2</sub>O addn. during oxidn. increases the yield of I from MePh by a factor of 5, from EtPh by 25-50%, and from V by 46-85%. NH<sub>3</sub> reacts even more energetically than O with aromatic compds. in the presence of V catalysts. Both H atoms and the NH<sub>2</sub> radicals add to the substrate (ammonolysis). Most easily reacting are O-contg. derivs. such as IV, which at 350-400.degree. over Sn vanadate gives PhCN in 70% yield. The addn. of a small amt. of O increases the yield of PhCN to 85-90%. This is attributed to the dehydrogenating character of the catalyst: PhCHO .fwdarw. PhC(O).cntdot. .fwdarw. PhCONH<sub>2</sub> (XIII) .fwdarw. PhCN. The monoalkylbenzenes + H<sub>2</sub>O and NH<sub>3</sub> catalytically yield either a mixt. of O- and N-contg. derivs. or give essentially only PhCN with a yield of 95-98%. When iso-PrPh is the substrate, the reaction is through V, I, and XIII. In the case of MePh, XIII is formed directly from IV, or from PhC(O).cntdot., skipping I as an intermediate. Such reactions are now called oxidizing ammonolysis or ammoxidation [Hadley, Chem. Ind. (London) 1961(8), 238]. The behavior of PrPh and BuPh is unusual in that, besides the usual production of I and III, with or without the presence of H<sub>2</sub>O, they are catalytically oxidized to give phthalic anhydride (XIV) in yields up to 20%. This is assumed to involve bicyclic intermediates, formed as the result of intramol. condensation of radicals of the type PhCH:CHCH<sub>2</sub>.cntdot. and PhCH:CHC(O).cntdot.. Oxidizing ammonolysis of PrPh gives PhCN and phthalimide. In the case of multiple alkyl groups (e.g., xylenes), the side chains react independently in catalytic oxidn. or in oxidizing ammonolysis. The addn. of H<sub>2</sub>O greatly increases acid yields; e.g., on addn. of H<sub>2</sub>O to air, the yield of terephthalic acid increases from 1-2% to 20-25%; from p-cymene from 1-2 to 45%. During oxidizing ammonolysis p- and m-dialkylbenzenes form amides and nitriles of monoalkylbenzoic and phthalic acids. From p-C<sub>6</sub>H<sub>4</sub>Me<sub>2</sub> over Sn and Ti vanadates the max. yield of p-toluic acid amide is 15%, the corresponding nitrile 51-55%, and the dinitriles of terephthalic acid 70-75% of theory. Oxidation. and oxidizing ammonolysis of mixts. of p- and m-C<sub>6</sub>H<sub>4</sub>Me<sub>2</sub> is unpredictable from

results with the sep. isomers. m-C<sub>6</sub>H<sub>4</sub>Me<sub>2</sub> normally yields 50-60% iso-phthalonitrile, but in equiv. mixt. with the p-isomer gives only low oxidn. yields. With addn. of more p-isomer, the yield of iso-phthalonitrile increases and at a meta-para ratio 1:9 the yield of nitrile is almost quant. The oxidn. and oxidizing ammonolysis of o-dialkylbenzenes proceed unusually because of interaction of the 2 side chains and the intermediate free radicals. Thus, compds. of the phthalan and **phthalide** types or XIV can be formed without I as an intermediate. In contrast to monoalkylbenzenes, p- and m-dialkylbenzenes in the presence of H<sub>2</sub>O tend towards complete oxidn., probably because the donation of H and OH radicals impedes intramol. isomerization, lowers total reaction rate, and contributes to the formation of free acids which are more susceptible to decarboxylation than XIV. By variation of oxidizing ammonolysis conditions, the process can be applied to aliphatic, alicyclic, and heterocyclic compds., thus synthesizing acrylonitrile from allyl chloride, and the nitriles of nicotinic and isonicotinic acid from 3- and 4-picolines.

IT 108-31-6, Maleic anhydride  
(oxidn. of)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



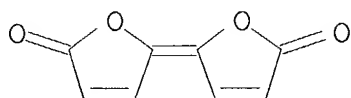
CC 32 (Physical Organic Chemistry)  
IT 65-85-0, Benzoic acid 71-43-2, Benzene 95-47-6, o-Xylene  
98-83-9, Styrene, .alpha.-methyl- 98-86-2, Acetophenone 99-87-6,  
p-Cymene 100-42-5, Styrene 100-51-6, Benzyl alcohol 100-52-7,  
Benzaldehyde 103-65-1, Benzene, propyl- 104-51-8, Benzene,  
butyl- 106-42-3, p-Xylene 106-51-4, p-Benzoquinone  
108-31-6, Maleic anhydride 108-38-3, m-Xylene 108-95-2,  
Phenol 123-31-9, Hydroquinone 134-81-6, Benzil 1074-12-0,  
Glyoxal, phenyl-  
(oxidn. of)

L56 ANSWER 13 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
1959:121990 Document No. 53:121990 Original Reference No.  
53:21863e-i,21864a-e Bifurandione. I. Preparation and  
characterization. Sauer, J. C.; Cramer, R. D.; Engelhardt, V. A.;  
Ford, T. A.; Holmquist, H. E.; Howk, B. W. (E. I. du Pont de Nemours  
& Co., Wilmington, DE). Journal of the American Chemical Society,  
81, 3677-81 (Unavailable) 1959. CODEN: JACSAT. ISSN: 0002-7863.  
AB The condensation of 2 moles C<sub>2</sub>H<sub>2</sub> with 4 moles CO under 100-1000 atm.

CO at 90-120.degree. in an inert solvent in the presence of a Co carbonyl catalyst yielded in conversions up to 70% (based on C<sub>2</sub>H<sub>2</sub>) cis- and trans-isomers of .DELTA.2,2' (5H,5'H)-bifuran-5,5'-dione (I). Analogous dilactones were prepd. from substituted acetylenes bearing alkyl or aryl substituents. Co<sub>2</sub>(CO)<sub>8</sub> (II) (1.5 g.) and 2.8 cc. MeOH in 200 cc. MeCN cooled to -78.degree. in a stainless steel rocker bomb, evacuated to about 5 mm., pressured with 7.5 g. C<sub>2</sub>H<sub>2</sub> to 100-200 lb. and then with CO to 600 atm., heated 17 hrs. with agitation at 90.degree. (900-1000 atm. gage), cooled to room temp., and filtered yielded 15.1 g. trans-I; the filtrate evapd. left 10.7 g. residue contg. 1.2 g. I. A similar run but with MeNO<sub>2</sub> as solvent and a pressure of 300 atm. gave 65% I. C<sub>2</sub>H<sub>2</sub> (26 g.), 200 cc. AcCH<sub>2</sub>CO<sub>2</sub>Et, and 2 g. Co(OAc)<sub>2</sub> pressured at 90.degree. with 800-1000 atm. CO yielded 47-9 g. I. The crude material recrystd. from AcOH, EtCOMe, or dioxane yielded pure trans-I, m. 237.degree. (decompn.). The filtrate from a typical mixt. evapd. and the residue triturated with Et<sub>2</sub>O gave a tan solid contg. small amts. of I and a major amt. of a dimer of tetrahydrobifurandione; variable amts. of a tan, completely insol. product, (C<sub>8</sub>H<sub>8</sub>O<sub>4</sub>)<sub>x</sub>, formed in some instances. CO(NMe<sub>2</sub>)<sub>2</sub> (200 cc.), 1.5 g. II, and 7.5 g. C<sub>2</sub>H<sub>2</sub> heated 15.8 hrs. at 90.degree. under 275-315 atm. pressure maintained by injection of CO gave cis-I. Crude trans-I (210 g.) in 500 cc. concd. H<sub>2</sub>SO<sub>4</sub> heated 4 hrs. on the steam bath, cooled, and poured onto 500 g. ice and 21. H<sub>2</sub>O yielded 176 g. (crude) cis-I, m. 248.degree. (EtCOMe). Crude trans-I (19 g.) heated several hrs. on the steam bath with 300 cc. 85% H<sub>3</sub>PO<sub>4</sub>, filtered from 5.8 g. undissolved material, and cooled yielded 4.8 g. cis-I. trans-I refluxed 5 hrs. in C<sub>5</sub>H<sub>5</sub>N was converted in 23% yield to cis-I; a part of the I was carbonized. trans-I (4.6 g.) in 350 cc. AcOH hydrogenated 8 hrs. at room temp. and 45 lb. over 0.05 g. PtO<sub>2</sub> while fresh catalyst and a few drops of concd. HCl were added twice, filtered, and evapd. gave 4.26 g. HO<sub>2</sub>C-(CH<sub>2</sub>)<sub>6</sub>CO<sub>2</sub>H, m. 137-8.degree. (AcOH). trans-I (16.4 g.), 25 g. (CH:CH<sub>2</sub>)<sub>2</sub>, and 200 cc. dioxane heated 17 hrs. at 200.degree. yielded 3.7 g. III, m. 232.degree. (EtOAc). III (2.0 g.) in 250 cc. 1-C<sub>10</sub>H<sub>7</sub>Me refluxed 48 hrs. with stirring with 1.5 g. 10% Pd-C under N, filtered hot, concd. to 1/5 the original vol., dild. with CHCl<sub>3</sub> and petr. ether, and cooled gave 70 mg. biphthalyl (IV), m. 331-4.degree. (CHCl<sub>3</sub>). Unsym. phthaloyl chloride (8 g.), 10 g. Cu powder, and 100 cc. C<sub>5</sub>H<sub>5</sub>N stirred 6 hrs. with cooling under N gave 0.2 g. pale yellow IV, m. 339-41.degree. (CHCl<sub>3</sub>). The appropriate substituted acetylene (0.2-1.0 mole), 1-2 g. II, and 100 cc. Me<sub>2</sub>CO heated under 800-1000 atm. CO pressure gave the corresponding disubstitution products of I; in this manner were prepd. the following products (substituent, % yield, and m.p. given): Me, 41, 183-4.5.degree.; Bu (V), 58, - (b2-3 190-205.degree.); 2-C<sub>10</sub>H<sub>7</sub>, 57, 218-20.degree.; p-ClC<sub>6</sub>H<sub>4</sub>, 55, 243-58.degree.; .omicron-MeOC<sub>6</sub>H<sub>4</sub>, 47, 186-220.degree.. The reaction of 100 cc. PhC.tplbond.CH, 50 cc. Me<sub>2</sub>CO, and 30 cc. PhNCO with CO yielded 6% isomer, m. 295-7.degree.,

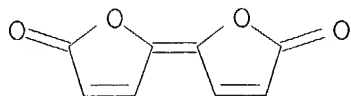
3% more sol. isomer, m. 176-8.degree.; in the absence of PhNCO the more sol. isomer was the main product (9%). A run with 80 cc. PhC.tplbond.CH and 100 cc. Me2CO yielded 21% cis-3,3'-isomer, m. 207-10.degree.; the other 2 isomers had the transconfiguration. The crude V distd. gave a liquid-solid mixt.; the solid portion recrystd. from EtOAc-petr. ether gave an isomer, m. 123-4.degree.. Cryst. V (0.75 g.) in AcOH hydrogenated over Pt, filtered, evapd. on the steam bath at 20-50 mm., the residual oil warmed 2 hrs. on the steam bath with 7 cc. SOCl2 and evapd. at 80.degree./20-30 mm. during 0.5 hr., the residue treated with 8 g. PhNH2 in 200 cc. Et2O, and the mixt. worked up yielded 0.44 g. dianilide of dibutylsuberic acid, m. 130-8.degree. (EtOH). The infrared absorption spectra of cis- and trans-I were recorded.

IT 111667-36-8, 2,4,6-Octatrienedioic acid,  
dibutyl-4,5-dihydroxy-, di-.gamma.-lactone 112117-55-2,  
2,4,6-Octatrienedioic acid, 4,5-dihydroxydimethyl-,  
di-.gamma.-lactone 113928-32-8, 2,4,6-Octatrienedioic  
acid, 4,5-dihydroxybis(o-methoxyphenyl)-, di-.gamma.-lactone  
(isomers)  
RN 111667-36-8 HCAPLUS  
CN 2,4,6-Octatrienedioic acid, dibutyl-4,5-dihydroxy-,  
di-.gamma.-lactone (6CI) (CA INDEX NAME)



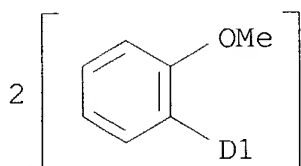
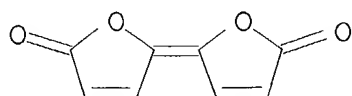
2 ( D1-Bu-n )

RN 112117-55-2 HCAPLUS  
CN 2,4,6-Octatrienedioic acid, 4,5-dihydroxydimethyl-,  
di-.gamma.-lactone (6CI) (CA INDEX NAME)

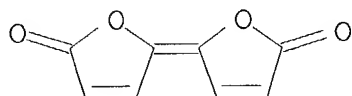


2 ( D1-Me )

RN 113928-32-8 HCAPLUS  
 CN 2,4,6-Octatrienedioic acid, 4,5-dihydroxybis(o-methoxyphenyl)-,  
 di-.gamma.-lactone (6CI) (CA INDEX NAME)



IT 1633-32-5, 2,4,6-Octatrienedioic acid, 4,5-dihydroxy-,  
 di-.gamma.-lactone  
 (isomers and related compds.)  
 RN 1633-32-5 HCAPLUS  
 CN 2(5H)-Furanone, 5-(5-oxo-2(5H)-furanylidene)- (9CI) (CA INDEX NAME)



CC 10G (Organic Chemistry: Heterocyclic Compounds)  
 IT 2,4,6-Octatrienedioic acid, 2,3,6,7-tetraethyl-4,5-dihydroxy-,  
 trans-, di-.gamma.-lactone  
 4-Octenedioic acid, 4,5-dihydroxy-, di-.gamma.-lactone,  
**polymers**  
 Octanedianilide, dibutyl-  
 IT .DELTA.3,3'-Bipthalide, 3a,3'a,4,4',7,7',7a,7'a-octahydro-  
 (and related compds.)  
 IT 111667-36-8, 2,4,6-Octatrienedioic acid,  
 dibutyl-4,5-dihydroxy-, di-.gamma.-lactone 112117-55-2,  
 2,4,6-Octatrienedioic acid, 4,5-dihydroxydimethyl-,  
 di-.gamma.-lactone 113928-32-8, 2,4,6-Octatrienedioic  
 acid, 4,5-dihydroxybis(o-methoxyphenyl)-, di-.gamma.-lactone  
 114821-80-6, 2,4,6-Octatrienedioic acid, bis(p-chlorophenyl)-4,5-  
 dihydroxy-, di-.gamma.-lactone  
 (isomers)  
 IT 1633-32-5, 2,4,6-Octatrienedioic acid, 4,5-dihydroxy-,



di-.gamma.-lactone

(isomers and related compds.)

- IT 482-23-5, .DELTA.3,3'-**Biphthalide** 505-48-6, Suberic acid  
101169-42-0, 3-Cyclohexene-1-carboxylic acid, 6,6'-  
(dihydroxyvinylene)di-, di-.gamma.-lactone  
(prepn. of)

L56 ANSWER 14 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

1959:45262 Document No. 53:45262 Original Reference No.

53:8162f-i,8163a Endo-bridge dilactones. Sauer, John C. (E. I. du Pont de Nemours & Co.). US 2859220 19581104 (Unavailable).

APPLICATION: US .

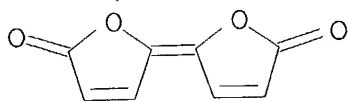
- AB Endo-bridge dilactones were prepd. by heating 1-2 moles conjugated diene and one mole unsatd. dilactone. E.g., 8.4 g. the trans dilactone .DELTA.2,2' (5H,5'H)-bifuran-5,5'-dione (I) (from C2H2 and dicobaltoctacarbonyl in acetone heated 14-17 hrs. with CO at 1000 atm.), and 13.8 g. .alpha.-phellandrene heated to 175.degree., cooled, and let stand several days gave a 1:1 adduct, m. 168-75.degree., after washing with petr. ether. Formulas are given for this and succeeding adducts. I (10 g.), 20 g. butadiene, 200 ml. dioxane, and 0.14 g. p-nitroso-N,N-diethylaniline heated 16 hrs. at 100.degree. in a closed vessel, and the solvent distd. gave 5.9 g. 1:1 adduct, m. 109.5.degree. (EtOAc-petr. ether), .lambda. 3.2 .mu. (.tplbond.CH), 3.4 .mu. (satd. CH), 5.5 .mu. and 5.6 .mu. (carbonyls of 2 lactone rings), 5.9 .mu. (exocyclic double bond), and 6.5 .mu. (conjugated unsatn.). I (25 g.), 13 g. 2,3-dimethyl-1,3-butadiene (II), hydroquinone, and 200 ml. dioxane heated 16 hrs. at 150.degree. gave 31.3 g. 1:1 adduct (III, m. 153-4.degree. (EtOAc-petr. ether), infrared spectrum similar to that above. The cis form corresponding to I (24.2 g.), 13 g. II contg. hydroquinone, and 200 ml. dioxane heated 16 hrs. at 150.degree. gave 8.6 g. 1:1 adduct (IV), m. 174-8.degree. (EtOAc), infrared spectrum similar to those above, and 19.1 g. III. III (15.1 g.) in 200 ml. dioxane heated 19 hrs. at 150.degree. and filtered gave 1.7 g. diadduct (V), m. 244.degree. (MeCOEt). IV had the expected infrared spectrum with no absorption for the central double bond and the lactone peak at 5.62 .mu.. I (20 g.), 22 g. II, and 200 ml. dioxane heated 18 hrs. at 175.degree. gave 9.2 g. diadduct, m. 240-3.degree., and 20.1 g. III. I (16.4 g.), 25 g. 1,3-butadiene, and 200 ml. dioxane heated 17 hrs. at 200.degree. gave 3.7 g. diadduct, m. 232.degree. (MeCOEt or EtOAc). IV (7.4 g.), 3.7 g. II, and 200 ml. dioxane heated 19 hrs. at 150.degree. and worked up gave 0.8 g. solid, m. 208-9.degree. (EtOAc). The products can be **copolymerized** with hexamethylenediamine to give pliable **resins**, useful for coatings and flexible and rigid substrates.

- IT 1633-32-5, 2,4,6-Octatrienedioic acid, 4,5-dihydroxy-,  
di-.gamma.-lactone

(isomers and related compds.)

RN 1633-32-5 HCAPLUS

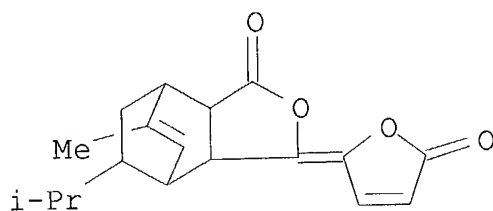
CN 2(5H)-Furanone, 5-(5-oxo-2(5H)-furanylidene)- (9CI) (CA INDEX NAME)



IT 109250-62-6, Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-8-isopropyl-6-methyl-, di-.gamma.-lactone 109252-56-4, Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-7-isopropyl-5-methyl-, di-.gamma.-lactone (prepn. of)

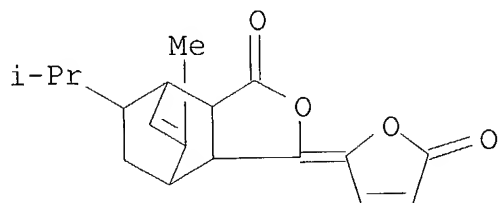
RN 109250-62-6 HCAPLUS

CN Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-8-isopropyl-6-methyl-, di-.gamma.-lactone (6CI) (CA INDEX NAME)



RN 109252-56-4 HCAPLUS

CN Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-7-isopropyl-5-methyl-, di-.gamma.-lactone (6CI) (CA INDEX NAME)



CC 10G (Organic Chemistry: Heterocyclic Compounds)

IT Coating(s)

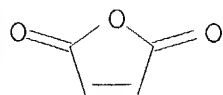
(from 1,6-hexanediamine polymers with dilactone adducts)

- IT **Polymerization**  
(of dilactone adducts with 1,6-hexanediamine)
- IT 3-Cyclohexene-1-carboxylic acid, 6,6'-(dihydroxyvinylene)bis[3,4-dimethyl-, trans-, di-.gamma.-lactone  
3-Cyclohexene-1-carboxylic acid, 6-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-, trans-, di-.gamma.-lactone  
3-Cyclohexene-1-carboxylic acid, 6-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-3,4-dimethyl-, stereoisomers, di-.gamma.-lactones  
.DELTA.3,3'-**Bipthalide**, 3a,3'a,4,4',7,7',7a,7'a-octahydro-5,5',6,6'-tetramethyl-
- IT .DELTA.3,3'-**Bipthalide**, 3a,3'a,4,4',7,7',7a,7'a-octahydro-(and related compds.)
- IT 1633-32-5, 2,4,6-Octatrienedioic acid, 4,5-dihydroxy-, di-.gamma.-lactone  
(isomers and related compds.)
- IT 124-09-4, 1,6-Hexanediamine  
(polymerization with dilactone adducts)
- IT 101169-42-0, 3-Cyclohexene-1-carboxylic acid, 6,6'-(dihydroxyvinylene)di-, di-.gamma.-lactone 109250-62-6,  
Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-8-isopropyl-6-methyl-, di-.gamma.-lactone 109252-56-4, Bicyclo[2.2.2]oct-5-ene-2-carboxylic acid, 3-(4-carboxy-1,2-dihydroxy-1,3-butadienyl)-7-isopropyl-5-methyl-, di-.gamma.-lactone  
(prepn. of)
- L56 ANSWER 15 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN  
1957:21563 Document No. 51:21563 Original Reference No.  
51:4290i,4291a-i,4292a-c Dimethyl-1,3,5-hexatrienes. Woods, G. Forrest; Viola, Alfred (Univ. of Maryland, College Park). J. Am. Chem. Soc., 78, 4380-3 (Unavailable) 1956. CODEN: JACSAT. ISSN: 0002-7863. OTHER SOURCES: CASREACT 51:21563.
- AB [Me2C(OH)C.tplbond.]2 (285 g.) in abs. EtOH to give a total vol. of 1040 cc. hydrogenated at 1200 lb. and room temp. over 1 g. 10% Pd-C, filtered, and distd. gave 271 g. [Me2C(OH)CH:]2 (I), m. 61-5.degree. (from CCl4). I (90 g.) distd. at 210-25.degree./20 mm. under N through a Pyrex column packed with 8-12 mesh Al2O3, the condensate collected in an attached Dry Ice trap, distd., and the lower-boiling fraction redistd. yielded 8.4 g. Me2C(OH)CH:CHCMe:CH2 (II), b. 145-7.degree., nD25 1.451. II hydrogenated under ambient conditions over Pd-C gave Me2C(OH)(CH2)2CHMe2, b. 147-9.degree., nD26 1.419, d29 0.808. I dehydrated similarly but at 390-400.degree. yielded a mixt. of (CH2:CMeCH:)2 (III) and 1,4-dimethylcyclohexadiene (IV), b31 45-9.degree., nD28 1.482; the mixt. chilled in Dry Ice and the cryst. deposit redistd. gave III, b25 43-4.degree., m. -9.degree., nD25 1.5106, d29 0.776. III was also obtained under the same conditions from II. I, II, or III passed through the Al2O3 at 500.degree. yielded 80-90% IV, b. 130-1.degree., nD31 1.472. IV (9

g.) added dropwise at 200.degree. to 1 g. 10% Pd-C, the mixt. refluxed 2 hrs., distd., and the distillate crystd. from an equal vol. of petr. ether (b. 30-40.degree.) gave 25% p-xylene. III treated in a similar manner was almost entirely **polymerized**; only a very small amt. of xylene was obtained. III and maleic anhydride yielded 70% adduct (V), m. 117-18.degree.. A small amt. of V in dil. aq. KOH extd. with Et2O, decolorized with C, filtered, acidified with HCl, and chilled gave 5-methyl-3-isopropyl-1,2,3,6-tetrahydrophthalic acid, m. 151-5.degree. (from hot H2O). V refluxed with a small amt. of Pd-C until the gas evolution ceased and distd. yielded 60% 5-methyl-3-isopropylphthalic anhydride (VI), white crystals, m. 81-2.degree.. VI dissolved in dil. aq. KOH and the soln. acidified with HCl gave 5-methyl-3-isopropylphthalic acid (VII), m. 169-70.degree. (decompn.). VI oxidized in the usual manner with KMnO4, the filtrate acidified with HCl, and the ppt. recrystd. from C6H6-dioxane yielded 50% 3,3-dimethyl-5,7-dicarboxyphthalide (VIII), m. 273-5.degree.. VIII (0.051 g.) treated with CH2N2 gave 0.013 g. di-Me ester of VIII, m. 165-6.degree. (from aq. MeOH). Maleic anhydride (4.9 g.) and 5.4 g. IV added to 10 cc. C6H6, the mixt. first cooled, then refluxed 2.5 hrs., evapd., and the residue distd. yielded 51% adduct (IX), b0.1 115-18.degree., m. 52-4.degree. (from ligroine, b. 60-80.degree.). IX in ligroine (b. 60-90.degree.) hydrogenated under ambient conditions over Pd-C gave the dihydro deriv. of IX, m. 62-3.degree. (from ligroine). IX treated with dil. alkali and then acidified gave the corresponding dicarboxylic acid, C12H18O4, m. 134-7.degree. (decompn.). CH2:CMeCH2Cl (150 g.) in 2.5 l. Et2O added dropwise to 85 g. Mg powder in 1 l. Et2O with stirring, the Grignard soln. filtered with gas pressure through glass wool, the unreacted Mg washed with an addnl. 0.5 l. Et2O, the combined Et2O filtrates treated with stirring with 70 g. CH2:CHAc in 100 cc. Et2O, and the mixt. poured into crushed ice and NH4Cl and worked up gave 86 g. CH2:CMeCH2CMe(OH)CH:CH2 (X), b10 46-7.degree., nD26 1.449, d25 0.854. X in MeOH hydrogenated under ambient conditions over Pd-C, filtered, and distd. gave Me2CHCH2C(OH)EtMe, b. 152-3.degree., nD26 1.423, d25 0.827. X (3-5 g.) and a small amt. p-MeC6H4SO3H heated to 180.degree. at a pressure adjusted in such a manner that the product distd. at about 90.degree. and the distillate redistd. again from p-MeC6H4SO3H gave 1.5-3 g. of a material, the ultraviolet absorption spectrum of which showed the typical peaks of a triene. X dehydrated with Al2O3 from 250 to 500.degree. gave 50-65% 1,3-dimethylcyclohexadiene (XI), b12 30.degree., nD 1.468-1.479. Hydrogenation of XI gave erratic results with 67% H uptake or less. XI dehydrogenated with Pd-C gave m-xylene or 1,3-dimethylcyclohexane contg. about 60% xylene; the aromatized mixt. treated with fuming HNO3 and concd. H2SO4 gave 2,4,6,1,3-(O2N)3C6HMe2, m. 181-2.degree.. XI (3.24 g.) and 2.94 g. maleic anhydride in 5 cc. C6H6 refluxed 24 hrs. and distd. gave the adduct (XII), b0.1 165.degree.. XII

dissolved in aq. KOH, acidified with HCl, and the resulting ppt. treated several times with aq. KOH and HCl yielded the dicarboxylic acid (XIII),  $C_{12}H_{16}O_4$ , m. 132-3.degree.. XII and XIII are probably mixts. XIII hydrogenated in the presence of a slight excess of aq. KOH, filtered, and acidified to pH 1 gave the diacid,  $C_{12}H_{18}O_4$ , white crystals, m. 124-5.degree. (decompn.); attempted recrystn. led to a viscous oil, probably the anhydride.  $Me(CH:CH)_2CH(OH)Et$  (XIV), b15 88-9.degree., b3 68-9.degree.,  $n_{D26}$  1.487, hydrogenated under ambient conditions over Pd-C gave  $AmCH(OH)Et$ , b. 172-4.degree.,  $n_{D26}$  1.421,  $d_{25}$  0.8223. XIV (20 g.) dehydrated over  $Al_2O_3$  at 300-10.degree. yielded 15 g. liquid product,  $C_8H_{12}$ , b10 40.degree.,  $n_{D26}$  1.526; it was fairly stable as a liquid but chilling gave a solid which underwent **polymerization** rapidly; the **polymer** recrystd. from petr. ether and dried became very tacky, and melted slightly above room temp. when sucked dry. XIV (10 g.) dehydrated over  $Al_2O_3$  at 490-500.degree./1.0 mm. gave 5.4 g. liquid,  $C_8H_{12}$ , b50 49-53.degree.,  $n_{D27}$  1.482, which is a cyclohexadiene; aromatization with Pd-C gave 75% mixt. of o-xylene and PhEt. The aromatized product (1.0 g.) oxidized with  $KMnO_4$  and KOH in the usual manner, filtered, decolorized with  $Na_2S_2O_3$ , washed with  $Et_2O$ , acidified, extd. with  $Et_2O$ , and the ext. concd. gave o- $C_6H_4(CO_2H)_2$ , m. 202-6.degree.; the mother liquor evapd. to dryness, the solid residue shaken with 2 cc.  $CHCl_3$  and 3 cc.  $H_2O$  to leave some solid, m. 206-8.degree., and the  $CHCl_3$  layer evapd. gave 0.5 g.  $BzOH$ .  $MeCH:CHCH:CHCH_2OH$  or  $(CH_2:CHCH:)_2$  passed through  $Al_2O_3$  at 490.degree. or 500.degree. at 20 mm. in a N atm. and the product dried and distd. gave 80-90% liquid, b. 79-82.degree.; this material disproportionated with Pd-C and distd., and the distillate hydrogenated under ambient conditions over Pd, filtered, and distd. gave 50%  $C_6H_6$ , b. 78-81.degree..

IT 108-31-6, Maleic anhydride  
(Diels-Alder reaction of, with dimethylcyclohexadienes and  
2,5-dimethyl-1,3,5-hexatriene)  
RN 108-31-6 HCAPLUS  
CN 2,5-Furandione (9CI) (CA INDEX NAME)



CC 10 (Organic Chemistry)  
IT 108-31-6, Maleic anhydride  
(Diels-Alder reaction of, with dimethylcyclohexadienes and  
2,5-dimethyl-1,3,5-hexatriene)

1939:24292 Document No. 33:24292 Original Reference No. 33:3484c

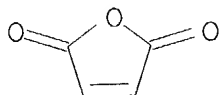
**Nonphenolic** oil-soluble **resins**. Fonrobert, Ewald  
Chemiker-Zeitung, 63, 137-9 (Unavailable) 1939. CODEN: CMKZAT.  
ISSN: 0009-2894.

AB A review of the prepn. and properties of com. **resins** of  
pale color and fastness to light, especially rosin-maleic anhydride  
**resins**.

IT 108-31-6, Maleic anhydride  
(**resinous** products with rosin)

RN 108-31-6 HCAPLUS

CN 2,5-Furandione (9CI) (CA INDEX NAME)



CC 13 (Chemical Industry and Miscellaneous Industrial Products)

IT **Resinous** products  
(oil-sol. light-fast)

IT 108-31-6, Maleic anhydride  
(**resinous** products with rosin)